REMARKS

The claims have been amended to more clearly define the as disclosed in the written description. In particular, the claims have been amended for clearity.

The Examiner has rejected claims 1, 2 and 8-10 under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent 5,434,926 to Watanabe et al. in view of U.S. Patent 6,360,187 to Hermann, and further in view of Official Notice. The Examiner has further rejected claim 3 under 35 U.S.C. 103(a) as being unpatentable over Watanabe et al. in view of Hermann and the Official Notice, and further in view of U.S. Patent 5,509,061 to Kuusama. Furthermore, the Examiner has rejected claim 5 under 35 U.S.C. 103(a) as being unpatentable over Watanabe et al. in view of Hermann and the Official Notice, and further in view of U.S. Patent 5,046,105 to Bohn. Moreover, the Examiner has rejected claim 6 under 35 U.S.C. 103(a) as being un patentable over Watanabe et al. in view of Hermann and the Official Notice, and further in view of U.S. Patent 6,891,954 to Takahashi et al. Finally, the Examiner has rejected claim 7 under 35 U.S.C. 103(a) as being unpatentable over Watanabe et al. in view of Hermann and Official Notice and Takahashi et al., and further in view of U.S. Patent 7,006,624 to Philipsson et al.

The Watanabe et al. patent discloses an automatic sound volume control method, in which the sound being reproduced is controlled based on detected environmental sounds. In particular, as indicated by Watanabe et al. at col. 2, line 54 to col. 3, line 2, a volume correcting value inferring portion 13 "obtains the

inference results of the control.rules on the basis of the individual frequency band component levels and the volume level, and inputs the weighted mean of the inference results to the audio equipment 14 as a volume correcting value Z to automatically correct the volume. Five control rules may be stored, of which the first control rule is that "if L is large, M-H is large and V is small, then the correcting value is large", the second control rule is that "if L is small, then the correcting value is small", the third control rule is that "if M is small, then the correcting value is small", the fourth control rule is that "if H is large, then the correcting value is small", and the fifth control rule is that "if V is large, then the correcting value is small".”

The Hermann patent discloses an ambient adjusted volume control for in-vehicle messages, in which “a sound level calibration table provides priority gain values for setting the programmable gain of a gain controller to ensure that message are reproduced at a sound level which is relatively greater than ambient noise level by a prede4termined target difference.” (Abstract).

The Official Notice taken by the Examiner is “that both the concepts and advantages of using a frequency noise band such as a band pass filter are well known in the art. Thus it would have been obvious to utilize a bandpass filter as the mid-range frequency noise band in Watanabe et al since the frequency range of the band pass filter is set by a user thus giving the system of

Watanabe et al more flexibility in noise compensation and thus more dynamic."

The Examiner has indicated that Watanabe et al. discloses:

> "a noise characterizing unit determining a noise level of environmental noise in a mid-range frequency noise band ***(fig. 2: 12b: col. 3. lines 47-53: noises in mid-range freguencv band are detected)***; a volume amplification unit to said input for amplifying a volume of the audio signal for all frequencies of the audio signal by a volume gain in dependence on the noise level in the mid-range frequency noise band ***(fig. 2: 14b: col. 3. line 61 through col. 4. line 6: senses the noise of the midrange frequency band and compensates for with an appropriate gain obtained from figure 2: 13)***, a further noise characterizing unit determining a further noise level of the environmental noise in a bass frequency noise band or a treble frequency noise band ***(fig. 2: 12a & 12c: col. 3. lines 42-46 & lines 54-59: senses the noises of each the low frequency band and high frequency band and compensates for them bv increasing the amplitude based on gain from the volume correction of figure 2: 13)*** and a further amplification unit amplify coupled to said volume amplification, unit for amplifying by a further gain the amplitude of frequency components in a bass frequency audio band a treble frequency audio band of the audio signaling dependence of the further noise level of the environmental noise in the base or treble frequency band, respectively to perceptually mask the environmental noise in the base frequency noise band or the treble frequency noise band from a respective base frequency or treble frequency audio band of the volume amplified audio signal ***(fig. 2: 14c: : col. 3, line 61 through col. 4, line 6: amplifier 14c adjusts the gain with the effect of volume correction of figure 2: 13)***".

Applicant believes that the Examiner is mistaken. In particular, while Watanabe et al. discloses separating the environmental noise into three frequency bands in the filter circuit 12, as clearly noted above, the volumne correcting value inferring portion 13 takes a weighted mean of the output from all three filters 12a, 12b and 12c, as well as the user set volume

level, and then forms a correction signal which is applied to the audio processor 14e, and then to the electronic volume control 14b.

Applicant submits, however, that claim 1 (and claim 9) clearly states "a volume amplification unit coupled to said input for amplifying a volume of the audio signal for all frequencies of the audio signal by a volume gain in dependence on solely the noise level in the mid-range frequency noise band".

Applicant further believes that the Examiner is mistaken, in that while the Examiner notes the amplifier 14c as meeting the claim limitation "a further amplification unit coupled to an output of said volume amplification unit for amplifying by a further gain the amplitude of frequency components in a bass frequency audio band or a treble frequency audio band of the audio signal, the value of said further gain being dependent solely on the further noise level of the environmental noise in the base or treble frequency band, respectively", it should be apparent that amplifier 14c coupled to the output of electronic volume circuit 14b, has an amplification factor (gain) which is completely independent of the environmental noise in either the bass or treble frequency range. Further, amplifier 14c amplifies the output of the electronic volume circuit 13 in its entirety, and not just in the bass or treble frequency bnads.

With regard to Hermann, the Examiner states "Hermann discloses allocating a maximum allowable gain (available headroom) and a programmable gain that has to be within the limit of the

maximum allowable gain (Hermann, fig. 7: 48-49: col. 4, lines 8-33)."

Applicant submits that the Examiner is misreading Hermann. In particular, according to Hermann at col. 4, lines 8-33, the programmable gain is increased to the maximum available gain of the amplification system. There is no allocation of gain between two separate amplifiers, as specifically set forth in claim 1 (and claim 9). Further, Applicant submits that Hermann further does not supply that which is missing from Watanabe et al., i.e., "a volume amplification unit coupled to said input for amplifying a volume of the audio signal for all frequencies of the audio signal by a volume gain in dependence on solely the noise level in the mid-range frequency noise band" and "a further amplification unit coupled to an output of said volume amplification unit for amplifying by a further gain the amplitude of frequency components in a bass frequency audio band or a treble frequency audio band of the audio signal, the value of said further gain being dependent solely on the further noise level of the environmental noise in the base or treble frequency band, respectively".

With regard to the Examiner's Official Notice, Applicant does not dispute the concepts and advantages of a bandpass filter are well known. However, this has nothing to do with the claim limitation "wherein said mid-range frequency noise band being complementary to said base frequency noise band and said treble frequency noise band, covering frequencies not in said base frequency noise band and said treble frequency noise band", which

describes the relationship between the mid-range frequency noise band and the bass and treble frequency noise bands.

Claim 3 includes the limitation "a gain consistency unit coupled to said noise characterizing unit and said further noise characterizing unit for yielding a gain consistently varying in time, according to a predetermined mathematical criterion".

The Kuusama patent discloses a sound reproduction system, in which a noise level signal "is applied to block 8, wherein it is processed to eliminate changes that are too abrupt from the signal. By such processing, the occurence of changes that are too abrupt in the gain of the amplifier 2 are prevented. The attack and decay processing of block 8 provides different time constants for reducing the gain of amplifier 2 (attack) and increasing the gain (decay)." While, arguably this may be equated to the gain consistency unit of claim 3, Applicant submits that Kuusama does not supply that which is missing from Watanabe et al., Hermann and Official Notice, i.e., "a volume amplification unit coupled to said input for amplifying a volume of the audio signal for all frequencies of the audio signal by a volume gain in dependence on solely the noise level in the mid-range frequency noise band", "a further amplification unit coupled to an output of said volume amplification unit for amplifying by a further gain the amplitude of frequency components in a bass frequency audio band or a treble frequency audio band of the audio signal, the value of said further gain being dependent solely on the further noise level of the

environmental noise in the base or treble frequency band, respectively", "wherein said mid-range frequency noise band being complementary to said base frequency noise band and said treble frequency noise band, covering frequencies not in said base frequency noise band and said treble frequency noise band," and "wherein said audio conditioning apparatus further comprises a gain dispatcher unit coupled to said input for allocating a maximum allowable gain of the volume amplification unit and the further amplification unit on the basis of available headroom for amplification".

Claim 5 includes the limitation "wherein the further amplification unit comprises a shelving filter".

The Bohn patent discloses an audio signal equalizer having accelerated slope phase shift compensated filters, in which the filter means includes a shelving filter circuit. However, Applicant submits that Bohn does not supply that which is missing from Watanable et al., Hermann and Official Notice, i.e., "a volume amplification unit coupled to said input for amplifying a volume of the audio signal for all frequencies of the audio signal by a volume gain in dependence on solely the noise level in the mid-range frequency noise band", "a further amplification unit coupled to an output of said volume amplification unit for amplifying by a further gain the amplitude of frequency components in a bass frequency audio band or a treble frequency audio band of the audio signal, the value of said further gain being dependent solely on

the further noise level of the environmental noise in the base or treble frequency band, respectively", "wherein said mid-range frequency noise band being complementary to said base frequency noise band and said treble frequency noise band, covering frequencies not in said base frequency noise band and said treble frequency noise band," and "wherein said audio conditioning apparatus further comprises a gain dispatcher unit coupled to said input for allocating a maximum allowable gain of the volume amplification unit and the further amplification unit on the basis of available headroom for amplification".

Claim 6 includes the limitation "wherein said audio conditioning apparatus is connectable to a headphone loudspeaker usable for reproduction of the audio signal, and wherein said audio conditioning apparatus further comprises an active noise canceling unit for substantially cancelling environmental noise in a cancellation band of frequencies, the environmental noise being measurable by a microphone."

The Takahashi et al. patent discloses a vehicle-mounted noise control apparatus in which an active noise control apparatus is included in a motor vehicle. However, Takahashi et al. does not supply that which his missing from Watanabe et al., Hermann and The Official Notice, i.e., "a volume amplification unit coupled to said input for amplifying a volume of the audio signal for all frequencies of the audio signal by a volume gain in dependence on solely the noise level in the mid-range frequency noise band", "a

further amplification unit coupled to an output of said volume amplification unit for amplifying by a further gain the amplitude of frequency components in a bass frequency audio band or a treble frequency audio band of the audio signal, the value of said further gain being dependent solely on the further noise level of the environmental noise in the base or treble frequency band, respectively", "wherein said mid-range frequency noise band being complementary to said base frequency noise band and said treble frequency noise band, covering frequencies not in said base frequency noise band and said treble frequency noise band," and "wherein said audio conditioning apparatus further comprises a gain dispatcher unit coupled to said input for allocating a maximum allowable gain of the volume amplification unit and the further amplification unit on the basis of available headroom for amplification".

Claim 7 includes the limitation "wherein said audio conditioning apparatus further comprises a distance measuring device for measuring a distance between the microphone and the headphone loudspeaker."

The Philipsson et al. patent discloses a loudspeaker volume range control, in which in a hands-free telephone system, the distance between the microphone and the loudspeaker is determined in order to control the volume of the loudspeaker. However, Applicant submits that Philipsson does not supply that which is missing from Watanabe et al., Hermann and The Official

Notice, i.e., "a volume amplification unit coupled to said input for amplifying a volume of the audio signal for all frequencies of the audio signal by a volume gain in dependence on solely the noise level in the mid-range frequency noise band", "a further amplification unit coupled to an output of said volume amplification unit for amplifying by a further gain the amplitude of frequency components in a bass frequency audio band or a treble frequency audio band of the audio signal, the value of said further gain being dependent solely on the further noise level of the environmental noise in the base or treble frequency band, respectively", "wherein said mid-range frequency noise band being complementary to said base frequency noise band and said treble frequency noise band, covering frequencies not in said base frequency noise band and said treble frequency noise band," and "wherein said audio conditioning apparatus further comprises a gain dispatcher unit coupled to said input for allocating a maximum allowable gain of the volume amplification unit and the further amplification unit on the basis of available headroom for amplification".

In view of the above, Applicant believes that the subject invention, as claimed, is not rendered obvious by the prior art, either individually or collectively, and as such, is patentable thereover.

Applicant believes that this application, containing claims 1-3 and 5-10, is now in condition for allowance and such action is respectfully requested.

Respectfully submitted,

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